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ANALYSIS STUDY OF MULTISPECTRAL DATA, ERTS-A, FROM AN AREA IN WEST PAKISTAN /

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15. Supplementary Notes		
16. Abstract Geomorphic features related to a known porphyry copper deposit at Saindak, western Chagai District, Pakistan, are easily distinguished on ERTS-1 images. No new prospecting sites were recognized on the basis of the images alone, but new information from the images was used in conjunction with known geology to evaluate two previously known speculative areas and to suggest one additional one. The study showed that Saindak-type deposits are less likely in some extensive areas of the Chagai District than I formerly believed.		
 The Saindak deposit is in an area of relatively soft folded sedimentary and volcanic rocks. The deposit is characterized by a linear zone of easily eroded sulfide-rich rock surrounded by a resistant rim of hornfels and propylitically altered rock. Both this rim and the central sulfide-rich valley are conspicuous features on the images. Swarms of dikes are probably useful for distinguishing real rims from other resistant rock types, but there is no expression of them on the image, although they are easily seen on aerial photographs of the Saindak rim.		
 During field mapping, patches of strong red and yellow hue related to the mineral natrojarosite were noted in the central valley. Attempts to detect a color anomaly using simple false color composites were not successful.		
17. Key Words Suggested by Author Copper Porphyry Copper Contact Metamorphism Mineral Exploration	18. Distribution Statement	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Not Applicable	21. No. of Pages 5
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Figure 2A. Technical Report Standard Title Page. This page provides the data elements required by DoD Form DD-1473, HEW Form OE-6000 (ERIC), and similar forms.

16. Abstract (continued)

The investigation showed that no rim like that at Saindak can be seen if regional metamorphism has increased the resistance of the country rock to erosion.

Type II Progress Report

ERTS-A

- a. Title: Analysis study of multispectral data, ERTS-A, from an area in West Pakistan
ERTS-A Proposal No.: SR 181
- b. GSFC ID No. of P.I.: IN 396
- c. No problems on project at present.
- d. The study has shown that the geomorphic features related to a known porphyry copper deposit at Saindak, in the project area, are easily distinguished on ERTS-1 images. New geologic information from the images was used in conjunction with known geology to evaluate one previously known prospect area and to suggest two additional ones, but no new prospects were recognized on the basis of the images alone. The study also showed that Saindak-type deposits are not likely to be present in some extensive areas of the region.

Plans for the next six-month period include:

- 1. Study of part of the "primary" image (Saindak area) by ratioing techniques to attempt enhancement of faint color anomalies associated with sulfide deposits. The study of negative/positive pairs of the primary image indicate that the test area may be enhanced this way, as may also the area of intense alteration on the volcano Koh-i-Sultan.
- 2. Examination of the color composites and perhaps also negative/positive pairs on the images to the east and west of the primary image, in order that the area most favorable for copper mineralization be wholly covered. (Parts of two images are involved.).
- 3. Comparison with color composites of areas in southeast Arizona that are known to have strong color anomalies associated with porphyry copper deposits. (With luck in selection, I think this can be done with one image.).

e. Several possible prospecting areas were evaluated using old data from reconnaissance maps, prospect descriptions, and personal experience together with new information from the image, and some possibly quite important adjustments of prospecting priorities have been proposed. Only field examination can establish the worth of these proposals. The study also showed that certain extensive areas are not likely to be porphyry copper-bearing, and ground surveys there can be placed on a lowest priority basis. In some circumstances this last type of recommendation might be the most useful and also the most cost-saving.

- e-1 Discipline category: A. Mineral exploration
- f. A paper was given at the March 5-9 ERTS-1 Symposium at New Carrollton, Maryland, entitled: "Use of ERTS-1 images in the search for porphyry copper deposits in Pakistani Baluchistan," and a manuscript was submitted at the same time for publication in the proceedings of the Symposium.
- g. No changes recommended
- h. No changes in Standing Order Forms
- i. No changes
- j. Data requests were submitted as follows:
 7 February
 26 March
 10 April